

Stroke

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b) Stroke

Caroline M. van Heugten

Introduction

Stroke or cerebrovascular accident is a disease of the blood vessels supplying the brain. Stroke has an incidence of 94/100,000 age-adjusted person-years in high income countries and 117/100,000 age-adjusted person-years in low-middle income countries (Feigin et al., 2009). Recent data from the World Health Organization (WHO) indicate that approximately 15 million people suffer a stroke each year, of whom five million die and five million are permanently disabled. The burden of stroke is expected to increase considerably as a consequence of our rapidly ageing population and the better survival rates of early stroke. While stroke incidence is increasing, stroke mortality is declining. The rising numbers of chronic stroke patients will result in changing demands on health care and changing health-care arrangements (Visser-Meily, van den Bos and Kapelle, 2009). Stroke survivors often experience problems in many different areas of functioning when being discharged home after hospitalisation or (inpatient) rehabilitation. Not only can stroke patients have physical limitations, but cognitive and emotional problems can also occur (Rasquin et al., 2004), which can lead to limitations in daily life and social activities (Scheepers et al., 2005). The lives of their caregivers can also be affected by the consequences of the stroke, as they often take partial or full responsibility for care provision, which can lead to caregiver burden or depression (Visser-Meily et al., 2008). These stroke-related problems are mostly long-lasting, requiring the provision of chronic care to patients and their caregivers.

Neuropsychological consequences following stroke

Brain injury due to cerebrovascular disease is a common cause of cognitive dysfunction in adults. Cognitive deficits are present in 50 to 70 per cent of stroke survivors (e.g. Barker-Collo and Feigin, 2006; Nys et al., 2005; Rasquin et al., 2002, 2004). Within the first two weeks 92 per cent of all stroke patients fail in at least one cognitive domain (Linden et al., 2005). Impairments in all cognitive domains are included, but the domains most commonly afflicted are visuospatial abilities, executive functions, memory, speed of information processing and language. These cognitive deficits after brain injury contribute independently to long-term outcomes affecting independent living, community reintegration and quality of life (Barker-Collo et al., 2010; Duits et al., 2008; Nys et al., 2005; van der Zwaluw, 2011; Wagle et al., 2011). Cognitive deficits should therefore be identified

at an early stage after brain injury (van Dijk and de Leeuw, 2012) and considered to be an important target for rehabilitation to improve overall outcome (Langhorne, Bernhardt and Kwakkel, 2011; Albert and Kesselring, 2012).

Depressive symptoms occur frequently after stroke and have a profound influence on functioning and quality of life. Prevalence rates of post-stroke depressive symptoms (PSDS) in the acute phase, reported in the literature, range from 5 per cent to 54 per cent and prevalence rates of major depression are still around 20 per cent two years post stroke (Van Mierlo et al., 2015). In the chronic phase (usually defined as less than six months post stroke), the most frequent emotional symptoms are depression (23–25 per cent) and anxiety (19–23 per cent) (Aben et al., 2002; de Wit et al., 2008; Kouwenhoven et al., 2011; Whyte and Mulsant, 2002). Post-stroke depression and anxiety often co-occur and interact, but may also be present in isolation. Apparently the post-stroke prevalence of anxiety is almost as high as it is for depression; hence, it is surprising that the literature largely focuses on post-stroke depression. Next to depression and anxiety, irritability, agitation, eating disturbances, and apathy are commonly found neuropsychiatric consequences post stroke (Angelelli et al., 2004).

Assessment of cognitive consequences

Given this impact, identifying cognitive deficits in the first days or weeks after stroke is essential for planning the most appropriate rehabilitation treatment, the discharge destination, and for discussing problems the patients and relatives may encounter in future. Many stroke guidelines recommend cognitive screening early after stroke, which has even been denoted a quality marker for stroke services (Hachinski et al., 2006). In the vascular cognitive impairment harmonisation standards (ibid.) a 5, 30 and 60 minutes testing protocol is presented, depending on the time and capacity available for assessment. Extensive neuropsychological assessment examining all cognitive domains separately and thoroughly is not feasible early after stroke because patients may not be medically stable or arousal levels and fatigue can confound the findings. Nevertheless, domain-specific cognitive abilities have a high prognostic value for cognitive and functional outcome (Nys et al., 2005). It is therefore recommended that all stroke patients at least receive cognitive screening before discharge from hospital. Many screening instruments were developed to identify people with dementia and are therefore sensitive to memory deficits but not to other cognitive deficits commonly seen after stroke. The Mini Mental State Examination (MMSE) is the most widely used instrument but it has insufficient sensitivity to detect patients with cognitive deficits after stroke (van der Zwaluw et al., 2011; Nys et al., 2005). Several recent reviews have shown that the Montreal Cognitive Assessment is nowadays the preferred instrument for cognitive screening after stroke (Stolwyk et al., 2014; van Heugten, Walton and Hentschel, 2015).

Neuropsychological rehabilitation post stroke

Given the prevalence and impact of cognitive, emotional and behavioural consequences post stroke, it is evident that stroke is one of the most frequently treated forms of brain injury in neuropsychological rehabilitation. Cognitive rehabilitation has been found to be effective in teaching patients with acquired brain injury compensatory strategies in many cognitive domains such as memory, executive functioning, neglect, speed of information processing and apraxia (Cicerone et al., 2011; van Heugten et al., 2012). Most studies into the effectiveness of cognitive rehabilitation have been done in mixed samples of stroke and traumatic brain injury; the evidence from stroke-specific studies is still rather limited (Gillespie et al., 2015). Current cognitive rehabilitation programmes are mostly based on the compensatory approach in which patients learn to live with the cognitive problems. The restorative approach, aimed at recovery of cognitive deficits, is not common in clinical practice yet because the results of these training programmes do not generalise to daily life functioning.

There is not yet much evidence to support psychological treatment of depression and anxiety (Hackett et al., 2008b; Campbell Burton et al., 2011), but given the success of cognitive behavioural therapy in other populations, this does seem the most promising approach in stroke patients (Kootker et al., 2015). Recently, a study by Thomas and colleagues (2013) showed that behavioural therapy improves mood in stroke patients with aphasia. A study into the cost-effectiveness of this method showed encouraging savings in resource use at follow up (Humphreys et al., 2015). Problem-solving strategies, motivational interviewing and psychoeducation can be considered to prevent depressive complaints (Hackett et al., 2008a).

Holistic neuropsychological rehabilitation treatments can be considered for neuropsychiatric and psychosocial problems after stroke (Cicerone et al., 2011). Behavioural modification techniques and cognitive behavioural therapy are the treatments of choice for challenging behaviours such as aggression and impulsivity (Cattalani, Zettin and Zoccolotti, 2010).

It is important to note that neuropsychological rehabilitation can be offered for many years after the stroke occurred and should also be considered in patients who seemed to have good functional outcome early after stroke. In ‘walking and talking’ patients early after stroke, the less visible neuropsychological consequences are often missed and therefore underdiagnosed and not adequately treated (Planton et al., 2012; van Dijk and de Leeuw, 2012). Information and education should always be offered as it has been shown that information can improve patient and caregiver knowledge of stroke and aspects of patient satisfaction, and reduces patient depression scores (Forster et al., 2012).

References

- Aben, I., Denollet, J., Lousberg, R., Verhey, F., Wojciechowski, F. and Honig, A. (2002). Personality and vulnerability to depression in stroke patients: a 1-year prospective follow-up study. *Stroke*, 33, 2391–2395.
- Albert, S.J. and Kesselring, J. (2012). Neurorehabilitation of stroke. *Journal of Neurology*, 259(5), 817–892.
- Angelelli, P., Paolucci, S., Bivona, U., Piccardi, L., Ciurli, P., Cantagallo, A., Antonucci, G., Fasotti, L., Di Santantonio, A., Grasso, M.G. and Pizzamiglio, L. (2004). Development of neuropsychiatric symptoms in poststroke patients: a cross-sectional study. *Acta Psychiatrica Scandinavica*, 110(1), 55–63.
- Barker-Collo, S. and Feigin, V. (2006). The impact of neuropsychological deficits on functional stroke outcomes. *Neuropsychology Review*, 16, 35–64.
- Barker-Collo, S., Feigin, V., Parag, V., Lawes, C. and Senior, H. (2010). Auckland Stroke Outcomes Study. Part 2: cognition and functional outcomes 5 years post stroke. *Neurology*, 75, 1608–1615.
- Campbell Burton, C.A., Holmes, J., Murray, J., Gillespie, D., Lightbody, C.E., Watkins, C.L. et al. (2011). Interventions for treating anxiety after stroke. *Cochrane Database of Systematic Reviews*, 12, CD008860.
- Cattalani, R., Zettin, M. and Zoccolotti, P. (2010). Rehabilitation treatments for adults with behavioral and psychosocial disorders following acquired brain injury: a systematic review. *Neuropsychological Review*, 20, 52–85.
- Cicerone, K.D., Langenbahn, D.M., Braden, C., Malec, J.F., Kalmar, K., Fraas, M., Felicetti, T., Laatsch, L., Harley, J.P., Bergquist, T., Azulay, J., Cantor, J. and Ashman, T. (2011). Evidence-based cognitive rehabilitation: updated review of the literature from 2003 through 2008. *Archives of Physical Medicine and Rehabilitation*, 92(4), 519–530.
- De Wit, L., Putman, K., Baert, I., Lincoln, L.B., Angst, F., Beyens, H. et al. (2008). Anxiety and depression in the first six months after stroke. A longitudinal multicentre study. *Disability and Rehabilitation*, 30, 1858–1866.
- Duits, A.A., Munnecom, T., van Heugten, C.M. and van Oosteburg, R.J. (2008). Cognitive and emotional consequences in the early phase after stroke: complaints versus performance. *Journal of Neurology, Neurosurgery and Psychiatry*, 79(2), 143–146.
- Feigin, V.L., Lawes, C.M., Bennett, D.A., Barker-Collo, S.L. and Parag, V. (2009). Worldwide stroke incidence and early case fatality reported in 56 population-based studies: a systematic review. *Lancet Neurology*, 8, 355–369.
- Forster, A., Brown, L., Smith, J., House, A., Knapp, P., Wright, J.J. and Young, J. (2012). Information provision for stroke patients and their caregivers. *Cochrane Database Systematic Reviews*, 11.
- Gillespie, D.C., Bowen, A., Chung, C.S., Cockburn, J., Knapp, P. and Pollock, A. (2015). Rehabilitation for post-stroke cognitive impairment: an overview of recommendations arising from systematic reviews of current evidence. *Clinical Rehabilitation*, 29(2), 120–128.

- Hackett, M.L., Anderson, C.S., House, A. and Halteh, C. (2008a). Interventions for preventing depression after stroke. *Cochrane Database Systematic Reviews*, 3.
- Hackett, M.L., Anderson, C.S., House, A. and Xia, J. (2008b). Interventions for treating depression after stroke. *Cochrane Database Systematic Reviews*, 3.
- Hachinski, V., Iadecola, C., Petersen, R.C., Breteler, M.M., Nyenhuis, D.L., Black, S.E., Powers, W.J., DeCarli, C., Merino, J.G., Kalaria, R.N., Vinters, H.V., Holtzman, D.M., Rosenberg, G.A., Wallin, A., Dichgans, M., Marler, J.R. and Leblanc, G.G. (2006). National Institute of Neurological Disorders and Stroke-Canadian Stroke Network vascular cognitive impairment harmonization standards. *Stroke*, 37(9), 2220–2241.
- Humphreys, I., Thomas, S., Phillips, C. and Lincoln, N. (2015) Cost analysis of the Communication and Low Mood (CALM) randomised trial of behavioural therapy for stroke patients with aphasia. *Clinical Rehabilitation*, 29(1), 30–41.
- Kootker, J.A., Rasquin, S.M., Smits, P., Geurts, A.C., van Heugten, C.M. and Fasotti, L. (2015). An augmented cognitive behavioural therapy for treating post-stroke depression: description of a treatment protocol. *Clinical Rehabilitation*, 29(9), 833–843.
- Kouwenhoven, S.E., Kirkevold, M., Engedal, K. and Kim, H.S. (2011). Depression in acute stroke: prevalence, dominant symptoms, and associated factors. A systematic literature review. *Disability and Rehabilitation*, 33, 539–556.
- Langhorne, P., Bernhardt, J. and Kwakkel, G. (2011). Stroke rehabilitation. *Lancet*, 377(9778), 1693–1702.
- Linden, T., Samuelson, H., Skog, I. and Blomstrand, C. (2005). Visual neglect and cognitive impairment in elderly patients late after stroke. *Acta Neurologica Scandinavica*, 111, 163–168.
- Nys, G., Van Zandvoort, M.J., De Kort, P.L., Jansen, B.P., Van der Worp, H.B., Kapelle, L.J. and De Haan, E.H. (2005). Domain-specific cognitive recovery after first-ever stroke: a follow-up study of 111 cases. *Journal of the International Neuropsychological Society*, 11(7), 795–806.
- Planton, M., Peiffer, S., Albucher, J., Barbeau, E., Tardy, J., Pastor, J. et al. (2012). Neuropsychological outcome after a first symptomatic ischaemic stroke with ‘good recovery’. *European Journal of Neurology*, 19, 212–219.
- Rasquin, S., Verhey, F., Lousberg, R., Winkens, I. and Lodder, J. (2002). Vascular cognitive disorders: memory, mental speed and cognitive flexibility after stroke. *Journal of the Neurological Sciences*, 203–204, 115–119.
- Rasquin, S., Lodder, J., Ponds, R., Einkens, I., Jolles, J. and Verhey, F.R. (2004). Cognitive functioning after stroke: a one-year follow up study. *Dementia and Geriatric Cognitive Disorders*, 18(2), 138–144.
- Schepers, V.P., Visser-Meily, J.M.A., Ketelaar, M. and Lindeman, E. (2005). Prediction of social activity 1 year poststroke. *Archives of Physical Medicine and Rehabilitation*, 86(7), 1472–1476.
- Stolwyk, R.J., O’Neill, M.H., McKay, A.J. and Wong, D.K. (2014). Are cognitive screening tools sensitive and specific enough for use after stroke? A systematic literature review. *Stroke*, 45(10), 3129–3134.
- Thomas, S.A., Walker, M.F., Macniven, J.A., Haworth, H. and Lincoln, N.B. (2013). Communication and Low Mood (CALM): a randomized controlled trial of behavioural therapy for stroke patients with aphasia. *Clinical Rehabilitation*, 27(5), 398–408.
- Van der Zwaluw, C., Valentijn, S., Mark-Nieuwenhuis, R., Rasquin, S. and van Heugten, C.M. (2011). Cognitive functioning in the acute phase post stroke: a predictor for discharge destination? *Journal of Stroke and Cerebrovascular Diseases*, 20(6), 549–555.
- Van Dijk, E.J. and de Leeuw, F.-E. (2012). Recovery after stroke: more than just walking and talking again. If you don’t look for it, you won’t find it. *European Journal of Neurology*, 19, 189–190.
- van Heugten, C.M., Wolters Gregorio, G. and Wade, D.T. (2012). Evidence based cognitive rehabilitation after acquired brain injury: systematic review of content of treatment. *Neuropsychological Rehabilitation*, 22(5), 653–673.
- van Heugten, C.M., Walton, L. and Hentschel, U. (2015). Can we forget the Mini-Mental State Examination? A systematic review of the validity of cognitive screening instruments within one month after stroke. *Clinical Rehabilitation*, 29(7), 694–704.
- Van Mierlo, M., van Heugten, C.M., Post, M., de Kort, P. and Visser-Meily, J. (2015). Psychological factors determine depressive symptomatology after stroke. *Archives of Physical Medicine and Rehabilitation*, 96(6), 1064–1070.
- Visser-Meily, A., Post, M., van de Port, I., van Heugten, C.M. and van den Bos, T. (2008). Psychosocial functioning of spouses in the chronic phase after stroke: improvement or deterioration between 1 and 3 years after stroke? *Patient Education and Counseling*, 73(1), 153–158.
- Visser-Meily, J.M.A., van den Bos, T. and Kapelle, J. (2009). Better acute treatment induces more investments in chronic care for stroke patients. *International Journal of Stroke*, 4, 352–353.
- Wagle, J., Faner, L., Flekoy, K., Bruun Willer, T., Sandvik, L., Fure, B., Stensrod, B. and Engedal, K. (2011). Early post-stroke cognition in stroke rehabilitation patients predicts functional outcome at 13 months. *Dementia and Geriatric Cognitive Disorders*, 31, 379–387.
- Whyte, E.M. and Mulsant, B.H. (2002). Post stroke depression: epidemiology, pathophysiology, and biological treatment. *Biological Psychiatry*, 52, 253–264.